

PM-2.5 and Ammonia Fact Sheet

Beginning with the 2006 Emission Year, DNR will require both Title V facilities and Minor Source facilities to report PM-2.5 and Ammonia emissions on their annual emissions inventories. Starting January 1, 2007, DNR will also begin requiring PM-2.5 and Ammonia to be included on the Title V Operating Permit Application.

Why am I being required to report PM-2.5 and Ammonia emissions now?

- The Consolidated Emission Reporting Rule (CERR) requires that DNR report PM-2.5 emissions to the National Emissions Inventory (NEI) starting with the 2002 Emission Year. Because facilities previously did not report PM-2.5 emissions on their annual inventories, DNR staff was forced to calculate the PM-2.5 emissions after the inventory data was pulled from SPARS. This was extremely time-consuming. For emission year 2002, over 15,000 Title V emission points were run through EPA's PM Calculator, which contained the only emission factors available at that time. Furthermore, because of time constraints, we were not able to share the data we generated with Industry prior to submitting it to the NEI. However, EPA has recently added over 600 emission factors for PM-2.5 to FIRE, so it will be easier for facilities to calculate their own PM-2.5 emissions.

PM-2.5 meets EPA's definition of regulated pollutant because a NAAQS standard has been promulgated for it. 567 IAC 22.105(2)"c" regarding Title V applications requires that *"The following emissions-related information shall be submitted to the department on the emissions inventory portion of the application: All emissions of pollutants for which the source is major and all emission of regulated pollutants..."*

- Ammonia emissions are important to air quality analyses because ammonia is involved in the formation of sulfate and nitrate, which are precursors for PM-2.5. Only primary ammonia needs to be reported. Primary ammonia means it is in the same chemical form as when it was emitted into the atmosphere. Secondary ammonia, such as ammonium sulfate and ammonium nitrate, is formed by chemical reactions in the atmosphere.

EPA's Consolidated Emission Reporting Rule (CERR), 40 CFR 51 Subpart A, requires DNR to report Ammonia emissions to EPA for the National Emissions Inventory starting with Emission Year 2002. For the past three years, DNR has been calculating and reporting only Title V Ammonia emissions from Ammonia nitrate production and cement manufacturing to EPA.

- Requiring PM-2.5 and Ammonia to be reported on the annual emission inventory benefits both DNR and Industry for the following reasons:
 1. It will be more cost-effective for both DNR and Industry than mailing out a separate PM-2.5 and Ammonia inventory questionnaires.
 2. It will save DNR staff time when compiling the NEI submittal.
 3. Facilities will be responsible for calculating and reporting their own emissions.
 4. Facilities will certify the accuracy of their PM-2.5 and Ammonia emissions.
 5. The data will be entered into and stored in SPARS, where everyone can access it.
- Beginning in January 2007, The Department is also requiring that potential PM-2.5 and Ammonia emissions be reported on the Title V Operation Permit Application and Minor Source Emissions Inventory so that the Department may evaluate the air pollution situation in the state for future planning activities. 567 IAC 21.1(3) states that *"The person responsible for equipment as defined herein shall provide information on fuel use, materials processed, air contaminants emitted, estimated rate of emissions, periods of emissions or other air pollution information to the*

director upon the director's written request for use in compiling and maintaining an emissions inventory for the evaluation of the air pollution situation in the state and its various parts...".

How do I calculate PM-2.5 emissions?

- FIRE –

The preferred method to calculate PM-2.5 emissions is EPA's Factor Information Retrieval (FIRE) Data System. The most current version of the database is FIRE 6.25. EPA has also developed a new Internet version of the database called WebFIRE. It is available at <http://www.epa.gov/ttn/chief/efpac/index.html>. Over 600 emission factors for PM-2.5 are now included in FIRE, including those for the following:

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|-------------------------------------|------------------------------------|
| ○ electrical generation | ○ cement manufacturing |
| ○ external combustion | ○ lime manufacturing |
| ○ internal combustion | ○ glass manufacturing |
| ○ ammonium nitrate production | ○ clay processing |
| ○ urea production | ○ brick manufacturing |
| ○ feed and grain terminal elevators | ○ stone quarrying |
| ○ grain millings | ○ pulp and paper and wood products |
| ○ beer production | ○ pulverized mineral processing |
| ○ meat smokehouses | ○ fabricated metal products |
| ○ primary metal production | ○ waste disposal |
| ○ secondary metal production | |
| ○ asphalt concrete | |

- AP-42 Particle Distribution –

Particle distributions for selected sources can be found in AP-42, Appendices B.1 and B.2. The PM-2.5 emissions may be calculated by applying a particle distribution factor to the PM emissions. The particle distribution should be used only as a last resort. EPA prefers the use of FIRE.

AP-42 is available on the web at <http://www.epa.gov/ttn/chief/ap42/index.html>. It is also included on EPA's Air Chief Version 12, which can be ordered online from <http://www.epa.gov/ttn/chief/software/airchief/index.html>.

- PM Calculator –

Unfortunately, EPA is no longer supporting the PM Calculator. Originally, the PM Calculator was created by EPA to help States develop PM-10 inventories. The Calculator uses information from AP-42 and FIRE such as emission factors, particle distribution, and control efficiency to calculate filterable particulate emissions. It calculates controlled PM-10 and PM-2.5 emissions from uncontrolled PM-10 or PM emissions for point sources with up to two control devices. The Calculator requires the user to input the SCC, control device code, and the uncontrolled PM or PM-10 emissions to do the calculation. Please note that the Calculator has not been updated to include the PM-2.5 emission factors added to FIRE 6.25.

There is also a conflict with the PM Calculator and MS Office 2000 and above. In some instances, if you have MS Office 2000 and above installed, the PM Calculator may not run, or MS Office software may no longer run. This does not occur on all desktops. While not supported, the PM Calculator is still available at <http://www.epa.gov/ttn/chief/efpac/efsoftware.html>.

Where can I find Ammonia emission factors?

Ammonia emission factors may be found in EPA's Factor Information Retrieval (FIRE) Data System. The most current version of the database is FIRE 6.25. EPA has also developed a new Internet version of the database called WebFIRE. It is available at <http://www.epa.gov/ttn/chief/efpac/index.html>. Emission factors are available for the following sources:

- Ammonia Production
- Ammonium Nitrate Production
- Ammonium Phosphates
- Animal/Poultry Rendering
- By-product Coke Manufacturing
- Catalytic Cracking Units
- Cement Manufacturing
- Electroplating Operations
- External Combustion Boilers
 - combusting anthracite coal, bituminous coal, subbituminous coal, lignite, residual oil, distillate oil, natural gas, wood waste, and/or bark waste
- Internal Combustion Engines
 - combusting distillate oil, natural gas, kerosene/naphtha (jet fuel), natural gas, gasoline, residual oil, and/or crude oil
- Reciprocating Engine Compressors
- Selective Catalytic Reduction (SCR) Sources
- Selective Noncatalytic Reduction (SNCR) Sources
- Sewage/Wastewater Treatment
- Urea Production

How do I report PM-2.5 and Ammonia emissions on my Title V Operating Permit Application, Title V Emissions Inventory, and/or Minor Source Emissions Inventory?

- Only emissions equal to or greater than 0.005 tons (rounds up to 0.01 tons) per emission unit need to be reported.
- The CAS number for Ammonia is 7664-41-7.
- PM-2.5 and Ammonia have been added to both the hard copy and electronic (SPARS) versions of the Title V and Minor Source forms.

Do Title V facilities have to pay fees on PM-2.5 and Ammonia emissions?

No. The PM-2.5 emissions are a subset of PM-10 emissions, which the Title V facilities already pay fees on, and Ammonia does not meet the definition of "regulated air pollutant (for fee calculation)" in 567 IAC 22.100 because it is regulated under 112(r).

Per this definition, a *"regulated air pollutant (for fee calculation)" means any "regulated air pollutant or contaminant" except the following:*

1. *Carbon monoxide*
2. *Particulate matter, excluding PM-10;*
3. *Any pollutant that is a regulated air pollutant solely because it is a Class I or Class II substance subject to a standard promulgated under or established by Title VI of the Act;*
4. *Any pollutant that is a regulated pollutant solely because it is subject to a standard or regulation under Section 112(r) of the Act.*

PM-2.5 and NH3 Example Calculations – Actual Emissions

1. Surface Coating Emissions

You may generally assume PM-2.5 = PM-10. No factors are available.

2. Natural Gas Emissions

Factors are available in FIRE and WebFIRE, but all assume that PM-2.5 = PM-10 = PM.

3. 94 MMBtu/hr Coal Boiler (spreader stoker, no control):

Throughput = 2,300 tons coal

SCC 10200204

Factor from WebFIRE = 5.64 lb PM-2.5/ton coal

2300 ton coal/yr x 5.64 lb/PM-2.5/ton coal x ton/2000 lb = 6.49 tons PM-2.5

Factor from WebFIRE = 0.565 lb NH3/1000 tons coal

2300 tons coal/yr x 0.565 lb NH3/1000 tons coal x ton/2000 lb = 0.0006 = 0.00 tons NH3

4. 15 MMBtu/hr Natural Gas Boiler (no control):

Throughput = 45 MMcf natural gas

SCC 10200602

Factor from WebFIRE = 7.6 lb PM-2.5/MMcf n.gas

45 MMcf n.gas/yr x 7.6 lb/MMcf n. gas x ton/2000 lb = 0.17 tons PM-2.5

Factor from WebFIRE = 3.2 lb NH3/MMcf n.gas

45 MMcf n.gas/yr x 3.2 lb/MMcf n. gas x ton/2000 lb = 0.07 tons NH3

5. Grain Handling (no control):

Throughput = 5,000 tons

SCC 3-02-007-52

Factor from WebFIRE = 0.87 lb PM/ton grain

Particle distributions from AP-42: 15% PM-10, 1% PM-2.5

5000 tons grain/yr x (0.87 * 0.15) lb PM-10/ton grain x ton/2000 lb = 0.33 ton PM-10

5000 tons grain/yr x (0.87 * 0.01) lb PM-2.5/ton grain x ton/2000 lb = 0.02 ton PM-2.5